Trust on the Internet : How the French ccTLD.FR Went From a Remarkable to a Speculative System

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Abstract—The Domain Name System (DNS), was invented in 1983 because it was too hard for the human brain to memorize IP addresses. The DNS works as a phone directory, setting a link between letters, the domain name, and an IP address. Layered and structured since its creation, the domain name made it possible to identify the linked resource and to have confidence in its content. However, this classification system was quickly replaced a big bang of naming possibilities, where the first comer is the first and sole served. This survey aims to study the repercussing of the naming rules of the French ccTLD, the .FR. As an introduction and in section I, we will see how an area of trust has been created through the ".FR". Then, through the section III and IV, how the easing of registration and use rules initiated confusion over the identification and trust by the domain name. Finally, we propose three ways to create the identification-trust link.

Domain Name System – Internet Trust – ccTLD – Internet Economics – Web Privacy – Semantic Web

I. INTRODUCTION

In 1984, J. Postel and J. Reynolds wrote the RFC920 [1], establishing the first domain names extensions. At the time, the idea was to read this sequence of alphanumeric characters from right to left, the extensions hierarchizing the domain names. COM, ORG, NET, EDU, MIL and ARPA became the first [2]. They will remain for posterity as generic constituents, called Generic Top Level Domain (gTLD).
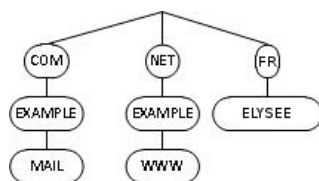

Figure 1. Architectures of domain names MAIL.EXAMPLE.COM, WWW.EXAMPLE.NET and NICE.FR

Two years later, Jon Postel created the first geographical Top Level Domain, grouped by countries and territories. This will be the ccTLD, Country-Code Top Level Domain. Using the ISO3166 postal standard [3], he picked the two-character country codes to create 243 extensions. This amount evolved after that, following the geopolitic situation. The fall of the Soviet Union and Yugoslavia has partially affected this list. Figure 1 gives an example of tree structure of the DNS.

II. FRENCH SITUATION

Regarding the .FR, a contact will be made between Postel and the INRIA, a French research institute speacialized in Computer Science and Automation, to delegate the French ccTLD.

Annie Renard and Jean-Yves Babonneau managed the .FR since September 2, 1986. Not being guided by any mimicry, the two researchers chose a hierarchical organization made of sub-domains and "le droit au nom", the entitlement to a domain name. Thus, the major part of professions, associations and governmental organizations will have their own private sub-domain name space. This structuring led them to contact the National Lawyer Union, representing the lawyer, the order of Geomatics Engineering Union, INPI, the French WIPO, etc.

These rules of registration were listed in a naming charter where the "droit au nom" prevailed. Each entity had to respect the structure of the .FR ccTLD. Some users, however, preferred the use of a .COM domain name, less expensive and offering less restrictive registration conditions than the .FR, and unexposed to such administrative procedures.

Faced with these criticisms, the INRIA decided to take actions: in 1997, its value fell by 23% and in 1998 by 22%. This situation made the registration of .FR domain names cheaper than .COM.

To register a .FR domain name, the applicants had to be legal entities, to file a request by fax, which was individually checked before the registration. This administrative burden made the .FR domain name space less used, compared to European ones, less structured. The German ccTLD, .DE, allowed any registration since its delegation by Jon Postel, in November, 1986. Any applicants could have a domain name at the second level domain, i.e., directly in .DE.

Despite the administrative load that it generated, the French system of the .FR avoided the problem of cybersquatting, which was in the interest of domain names owners [4]. Indeed, the feeling of the trust in the .FR naming space was established. Similarly, numerous surveys highlighted the benefits of the French ccTLD.

Pressures, whether administrative or mercantile made the AFNIC, the newly formed association managing the .FR, to abandon the old registration rules: deletion of the "droit au nom" in 2004, opening to private individuals in 2006, deletion of most of the sub-domains in 2007 and

allowance of one and two-characters domain names registration in 2014 [5].

The number of .FR domain names registrations became a Key Point Indicator for the AFNIC, as evidenced on its chief executive's resume [6].

The liberalization of the French ccTLD, .FR, had an important influence on the strategy of deposits. Once a flagship and application of French research, the .FR is managed by a semi-state associated structure that cannot act against the loss of confidence in domain names. If everybody can register anything, the legitimacy has given way to speculation.

The merchandising of computing resources, such as IP addresses [7] and now domain names, involves risks for the functioning of Internet [8].

Today, 3 million domain names are registered in .FR: 60% by organizations, 40% by individuals. While the deposits are supposed to be only opened to European citizens, Australia and China represent respectively the eleventh and fourteenth place of the countries of registration [9].

The number of registrations in .FR naming space is similar to the Italian's ccTLD. These figures, although apparently high, are considerably lower than those of Germany (.DE), 16 millions [10], and the Netherlands (.NL), 5.7 millions [11]. This situation has an important consequence on the identification-trust link, as showen in Figure 2.
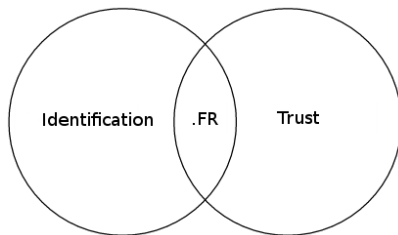

Figure 2. Identification-Trust link [12]

Originally, the French extension .FR had two goals:

- Identification: people are able to know the associated content by reading the domain name;

- Trust: registration rules exist before each deposit. People can trust the authority of the registrant;

III. IMPACT ON IDENTIFICATION

The absence of a naming charter defined for French administrative entities, apart from the .GOUV.FR sub-domain, prevents the identification function of the domain name. Under the former AFNIC charter, French embassies were supposed to be named under the form AMBA-YYY.FR, YYY being the name of the city or the country. Nowadays, embassies use the address AMBAFRANCE-XX.ORG, where XX is the ISO3166 country code.

- Of the 209 domain names beginning with "AMBAFRANCE", only 149 are official;
- Of the 150 official websites of the Embassies, only 138 comply with the AMBAFRANCE-XX.ORG charter;

The registration under .ORG being open to all, the preventive filing of domain names is thus necessary, as France has done for North Korea, where it does not have an embassy. AMBAFRANCE-KP.ORG was registered on December, 19. 2000 by the Ministry of Foreign Affairs.

In this case of French embassies, it is simply not possible to identify with certainty a website on the basis of its domain name. This situation exists since the liberalization of the French ccTLD .FR for commercial intent.

France overseas, represented by ISO3166 codes, is also impacted by the lack of numerical coherence.

- *Saint Pierre et Miquelon, Réunion, TAAF, Wallis-Futuna* and *Mayotte* inherit of an open naming charter similar to that of the .FR;
- *Guadeloupe, Martinique* and *French Guyana* have ccTLDs which are not managed by AFNIC despite the Postal and Telecommunications code provisions [13];
- *Saint-Barthelemy* (.BL) and *Saint-Martin* (.MF) have non-delegated extension, despite the stated will of *Saint-Barthelemy [14]*;
- *Clipperton* (.CP) has a non-delegated ccTLD;

NB: French Polynesia (.PF) and New Caledonia (.NC) are managed by other public bodies in agreement with the competent territorial authorities [15].

IV. IMPACT ON TRUST

An Internet address can both inspire implicit confidence and be a lure that can disturb consumer information. Let us take the recent case of addresses on the subject of abortion. The voluntary termination of pregnancy, commonly written and called IVG in France, has been authorized in the country since 1975. Many Internet websites, using the government's communication codes, act as official information websites. This situation is an issue given that 80% of young women aged 15-30 find the obtained information on the Internet credible. 57% get information on health issues via the Internet [16]. It is thus essential to give them a technical tool to identify reliable information on the Internet, as search engines do not include the veracity of the words in the search results. As we can see in Figure 3, subdomains work.

Conditions of the questionnaire: answer by form. 137 students with an average age of 18 years: 90 women, 47 men. 129 had their baccalaureate in 2016, 8 in 2015. 10 passed their C2I, a French IT and Internet certificate., 127 did not. One can thus define that it is a predominantly female population, being 18 years old and not being trained to the bases of the good understanding of the

Internet. Task: Rank these websites according to the confidence level: 0-1-2-3 (0 for the website you trust the less, 3 the more). Respondents are not allowed to click on the links, only identification by the domain name is possible.

Domain name	Ranking
IVG.SOCIAL-SANTE.GOUV.FR	2,27
IVG.FR	1,51
ECOUTEIVG.ORG	1,49
IVG.NET	1,07

Figure 3. Ranking

It can thus be noted that trust via the sub-domain ".GOUV.FR" is a reality. So-called "reserved" space, registration of domain names with this extension is only possible for the French Government. It is thus possible to develop and encourage the creation of spaces of trust.

Confronted with AFNIC's encouraging press releases on the ".FR's confidence", it can be noted that this extension has a classification similar to the extension .ORG considered "open", although enjoying an apparent image of confidence. .NET, considered as an alternative to .COM, occupies the last place.

V. PROPOSALS

1. Creation of a French trust area

Faced with the difficulties generated by the liberalization of the .FR zone, which has become a commercial area, we now suggest using the .FX extension as a closed zone. The .FX extension, unused until now by France, originally represents metropolitan France. It is thus possible to use it as a hierarchical space with a right to the name for any holder of any right. Thus, through a logical hierarchy, it will be easy to define the legitimacy of depositors. Therefore, by creating and assigning namespaces for any user, France would become the first country to provide a domain name to its nationals:

- Free of a domain name and associated email address for any French entity or individual;

- Creation of a space of confidence, .FX, in addition to a commercial space, .FR;

- Strengthening of certain digital sovereignty in the face of confidentiality gaps (Yahoo, PRISM program, etc.);

As the .FX extension is part of the ISO 3166 code, France does not have to pay fees to the ICANN as it would be if the country intended to generate a new gTLD. This new space could be funded by delegating another unused extension, .CP (originally meant to stand for the Clipperton atoll) to an interested organization or company, just as Norway allowed the Netherlands to manage the extension .BV (corresponding to the Bouvet island, BV meaning *besloten vennootschap*, Ltd, in Dutch).

Formerly, the length of hierarchical domain names appeared as redhibitory, at a time when users often had to manually type domain names into their browsers. However, in 2017, the access to the major part of the information on the Internet is carried out through a search engine, the domain name being mainly used to identify the source. This will make it easier to index and archive.

As a conclusion, a major advertising campaign carried out by the APIE, could require depositors to use .FX instead of .FR. The rules of identification via the .FX space would be explained through the B2I and C2I, French IT and Internet Certificates [17].

2. Fighting speculation in the area.

In order to strengthen the .FR zone, it is suggested to propose the registration of domain names in .FR for a decennial period, similar to trademarks functionment, instead of annual fees. The financial curb would reduce the number of speculative registrations, motivated by an attractive rate. The fact of having to spend ten times as much, admittedly for ten times more temporal coverage, will generate a financial mechanism of restraint. The commitment contracted for every ten years, may be paid in annual installments.

A second step will be the regularization of domain name registrants, including the phasing out of domain names registered by non-European registrants. Alternatives, proposed by the registrars, exist, called local presences. The follow-up of the exit of Great Britain from the European Union will have to be carried out.

3. Delegation of overseas extensions

With a view to territorial homogeneity, it is advisable to encourage the French Government to have the extensions of Guadeloupe, Martinique and French Guyana delegated by AFNIC. Similarly, Saint-Barthelemy and Saint-Martin will have to be represented by a TLD subject to the possibility of registrations.

VI. CONCLUSION

These three proposals will serve to reinforce the French zones in the digital namespace. The proposed French system will be able to operate in the same way as the USA's system, which uses closed extensions (.GOV, .MIL, .EDU) and public (.COM, .BIZ, .US). It is essential today, in the face of the development of foreign solutions, to ensure digital sovereignty for France and its fellow citizens, through coherent and representative charters of qualifications and titles.

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